Saskatchewan Ministry of Agriculture

CROP PRODUCTION NEWS

Volume 30, No. 2 **June 2, 2008**

PRODUCTION

Editor's Comments

Ray McVicar, Crop Development Branch (Ray.McVicar@gov.sk.ca)

Seeding has progressed quickly in many areas of the province this spring. The lack of general rainfall has allowed growers to keep seeding. Some regions have received a little rain, but we hope for much more in most areas. For an update on the province's seeding progress, and the progress of the crop throughout the growing season, check out the Saskatchewan Ministry of Agriculture *Weekly Crop Report* at: www.agriculture.gov.sk.ca/Crop-Report

Some areas report spotty crop emergence due to poor soil moisture conditions and cool temperatures. Frost was also reported in the last week of May. For information on optimum and minimum plant populations for crops, check out the article provided in this issue. For growers carrying crop insurance, it is important to check with Saskatchewan Crop Insurance Corporation before taking any reseeding action.

We have experienced a lot of wind across the province in the past week, which can slow pesticide application. As seeding operations are nearly completed, crop protection now becomes the big priority. Always remember to check the labels of products being used, and follow the rules for applicator safety, and for safety to the environment. The spring update to the *Guide to Crop Protection 2008* is now available on our website at: www.agriculture.gov.sk.ca/Guide_to_Crop_Protection

The update provides information on the crop protection products registered since the Guide was published in January.

NOTE: Throughout this document you will see that some publications are in blue font and underlined, indicating links to website information. If you are reading this off your computer screen, press the CTRL button and click your cursor on the link to take you directly to the website. ☼

The ***Crop Production News*** is a biweekly publication prepared primarily by provincial specialists with the Crop Development Branch of the Saskatchewan Ministry of Agriculture. The newsletter includes a compilation of articles related to entomology, plant pathology, weed science, soils and agronomy issues.

If you wish to be added to or removed from our mailing list, forward your request by email to: Sean.Miller@gov.sk.ca

INSIDE

Cereal Rust Update

By Blaine Recksiedler, Provincial Cereal Crops Specialist

Although it is too early in the season to flag potential rust problems for the rust prone areas of the Canadian Prairies, it is a good time to describe the current rust build-up situation in the United States, and to remind people where to find the United States Department of Agriculture (USDA) Cereal Rust Bulletin.

Cereal rust disease is caused by *Puccinia* spp., and rust spores generally follow the *Puccinia* pathway of the central U.S. corridor. Many factors will interplay to determine the severity of the potential problem for the prairies, such as timing of crop development along the *Puccinia* pathway, temperature, humidity, changes to rust races, and susceptibility of varieties. All of these will determine the build-up of rust spores for the season.

Wheat Stem Rust

Wheat stem rust is currently increasing in certain locations in the southern United States. The majority of bread wheat varieties grown in Manitoba and Saskatchewan have good resistance to stem rust, while durum wheat varieties offer very good resistance.

Wheat Leaf Rust

Wheat leaf rust is considered to be widespread, increasing, and in some cases, severe in southern states. It has been detected as far north as central South Dakota. The range of resistance between wheat varieties is greater for leaf rust than for stem rust. Many varieties are rated as good, or very good, for resistance to leaf rust. However, some very popular varieties within most wheat classes, except for durum wheat, are rated as only poor or fair. Durum wheat varieties offer very good resistance.

Leaf Rust. Source: Brent McCallum, AAFC

Wheat Stripe Rust

Wheat stripe rust is currently at low levels in the Midwest U.S., and considered severe in California. Stripe rust is generally uncommon in Saskatchewan and Manitoba. Since it prefers high humidity and cool night time temperatures for infection, it is generally found in the regions of higher elevation in Alberta and British Columbia. However, since 2000, stripe rust in wheat is has appeared more frequently in Manitoba and Saskatchewan.

Oat Stem and Leaf Rust

Oat stem and leaf rust are considered light in the southern United States. Leggett, HiFi and Triactor oat varieties offer good or very good resistance to current races of leaf rust.

(Continued on page 3)

Cereal Rust Update **(Continued from page 2)**

Summary

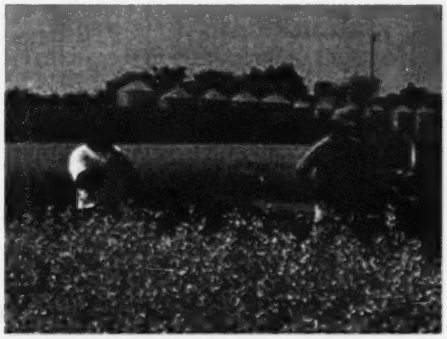
Environmental conditions conducive to rust establishment are warm days, heavy dew, and high winds. The extent to which our crops will be affected will depend on weather, genetic resistance and stage of crop development. The majority of yield and quality potential of earlier seeded crops may already be determined before rust becomes established. The later crops, however, especially varieties with poor resistance, will be at serious risk if the environmental conditions comply, especially if significant inoculum levels have been established in the United States.

Developing genetic resistance is the best strategy to combat rust. Crop varieties that do not offer good resistance should be grown outside the traditional rust areas. Southern Manitoba and southeastern Saskatchewan are at the greatest risk of incurring significant yield loss to rust. For rust resistance ratings, please see the publication *Varieties of Grain Crops 2008* on the Saskatchewan Ministry of Agriculture website.

The Cereal Rust Bulletin tracks the progression of rust in the U.S., and can be found on the USDA Agricultural Research Service website at www.ars.usda.gov/Main/docs.htm?docid=975 ✿

2008 Agri-ARM Field Days

By Shannon Chant, Crop Development Specialist, Swift Current



Melfort Field Day 2007. Photo: Saskatchewan Agriculture

The Saskatchewan Agri-ARM (Agriculture-Applied Research Management) Program connects eight regional applied research and demonstration sites into a province-wide network that allows government, producers, researchers and industry associations to partner on provincial and regional projects. Each location has an affiliated producer group that sets the research priorities for that site. The Agri-ARM program receives funding from the Saskatchewan Ministry of Agriculture and a wide range of commodity and industry groups. Each location has its own specific projects, as well as projects that are carried out at other locations. Projects include, but are not limited to, regional variety testing, new crop agronomy, weed control technology, fertility evaluations, equipment technology, crops for biofuel, new technology and many others. All Agri-ARM sites host an annual Field Day to showcase the projects at their location.

Come join us at the Agri-ARM Field Days this summer!

(Continued on page 4)

2008 Agri-ARM Field Days **(Continued from page 3)**

The dates and contact information for the 2008 Field Days are:

Research Foundation	Location	Date	Contact
Saskatchewan Conservation Learning Centre	Prince Albert	Early August	Curtis Braaten 306-953-2797 info@conservationlearningcentre.com
Wheatland Conservation Area Inc.	Swift Current	July 10	Bryan Nybo 306-778-7289 NyboB@agr.gc.ca
Western Applied Research Corporation	Scott	July 16	Sherrilyn Phelps 306-446-7475 Sherrilyn.Phelps@gov.sk.ca
South East Research Farm Inc.	Redvers	July 17	Garth Johnston 306-452-3161 serf@sasktel.net
Indian Head Agricultural Research Foundation	Indian Head	July 22	Judy McKell 306-695-4200 judymckell@yahoo.ca
Melfort Research Farm	Melfort	July 23	Randy Kutcher 306-874-2477 KutcherR@agr.gc.ca
East Central Research Foundation	Canora	July 24	Kim Stonehouse 306-563-5551 ecrf@sasktel.net

For more information on the Agri-ARM program, please visit the Agri-ARM website at: www.agriculture.gov.sk.ca/Agri-ARM. ✿

Disease Scouting Tips

By Faye Dokken, Provincial Plant Disease Specialist

Growing up on a farm in southwest Saskatchewan, I have vivid childhood memories of Sunday family drives and making many stops to check our crops along the way. We always had fun, measuring our height against the crop, catching insects, or picking weed bouquets. But, I realize now that these outings also allowed my parents to gauge the growth and health of their crops, and scout for any potential pest management problems that needed to be addressed. Whether it is part of your livelihood or hobby, crop scouting is an important activity that doesn't have to be a tedious chore.

(Continued on page 5)

Disease Scouting Tips **(Continued from page 4)**

One component of crop scouting is accurate identification of plant diseases in time to make management decisions to avoid economic loss. Disease scouting may begin at the seedling stage and continue on a regular basis throughout the summer. Timing and frequency will depend on your crops and diseases of interest.

You know your fields best, so design your scouting routine around this expertise. Note the history of crops, inputs, and pests in each field. Investigate any potential hot spots (eg. headlands), and then search the field in a tear drop or W pattern, visiting five sites, if less than 100 acres, and 10 sites, if more than 100 acres. Note symptom patterns in the field. A uniform pattern may suggest an abiotic (non-living) factor, such as chemical damage or residue. Random patterns may be more likely to indicate disease. You may want to bring a magnifying glass to identify inconspicuous signs and symptoms of diseases, and photos or illustrated field guides to aid your diagnosis. Signs of disease include structures or products associated with the pathogen. Symptoms are detectable external and/or internal changes in the plant, as a result of infection. If you're unsure, take a photo, consult an agronomist, or send a sample to the Crop Protection Laboratory.

At this time of year, you may start to notice seedling diseases when conditions for plant growth are poor. Soil-borne diseases such as seed rot, root rot, seedling blight, and damping-off (sudden collapse/death of seedlings) may predominate under warm and moist conditions, or conversely, cool and dry conditions. Emerging canola fields may exhibit areas of stand reduction, which should be scouted for symptoms such as decayed seeds and/or roots and collapsed seedlings with shriveled stems. Infected cereal plants often go unnoticed, as they will likely be scattered throughout the field, rather than patches. Seedling diseases of pulses may result in patchy stands due to poor emergence, root lesions, stunting, and/or collapsing of seedlings.

Chickpeas should also be scouted early for ascochyta blight. Begin scouting at the seedling stage and return every three to seven days. Be prepared to apply a preventative fungicide application at the seven to 10 node stage, and watch out for warm temperatures (20-25°C) and wet weather, which favour spore release and disease spread. Crops that have been treated with a fungicide application will be protected during subsequent rainfall. Symptoms of ascochyta are tiny light brown to dark brown spots, expanding into lesions with distinct margins on lower leaves, and progressing upwards to all above-ground parts. You should also notice black fruiting bodies (pycnidia) within the lesions, which is a sign that the ascochyta pathogen is producing spores that can cause additional infections. In chickpea fields where ascochyta is spreading quickly, you may observe circular patches of dead and dying plants.

Remember to make crop scouting part of your routine, learn what you can from your colleagues and neighbours, and pass on your expertise to other farmers and agronomists in your area. ☼

Early Season Insects – 2008

By Scott Hartley, Provincial Insect and Vertebrate Specialist

Due to cooler climatic conditions throughout much of the province in April and May, insect pressures have been slow to develop. However, some of the insects of note include cutworms, flea beetles and pea leaf weevils.

Cutworms

Cutworm infestations appear to be the main insect issue in many crops including lentil, mustard, canola and cereals. They have been reported throughout the south, southwest and west central regions. Most reports relating to cutworms have described larger worms (approximately one inch long). Cutworms such as red-backed or pale western that hatch in the spring are unlikely to have reached this size under the cooler conditions this spring. However, both army (*Euxoa auxiliaries*) and dingy (*Feltia jaculifera*) cutworms hatch from eggs in the previous fall and over-winter as partially grown larvae. Both of these species tend to feed on foliage above ground. Large infestations are capable of completely defoliating young seedlings. Typical cutworm damage is found more frequently on hilltops and drier areas of a field.

Samples submitted to the Crop Protection Laboratory from the Kindersley area were identified as army cutworm. Since these cutworm species start earlier in the spring, they also complete the larval stage of their life-cycle, going into pupation earlier in June. The cutworms that hatch in the spring generally do not pupate until near the end of June.

Cutworms are nocturnal, staying below ground during the day and coming to the surface to feed in the evening or at night. Due to cooler conditions feeding and pupation may be later in 2008, extending into the middle of June for the army and dingy species, and into July for the pale western and red-backed cutworms.

Foliar insecticides are registered for control of cutworms. Refer to the *2008 Guide to Crop Protection* for registered products in specific crops. Economic thresholds will depend on the cost of control and the value of the crop, and can therefore vary from the suggested levels. For example, if the value of the crop increases or the cost of control decreases, the economic threshold would be lowered.

Some examples of suggested economic thresholds are:
Spring cereals: three to four cutworms per square metre
Dry bean: one or more cutworm per metre of row
Canola: 25 to 30 per cent stand reduction
Flax: four to five cutworms per square metre
Sunflowers: 10 cutworms per square metre

Insecticides should be sprayed on the soil surface in the evening. As the cutworms come to the soil surface to feed, they come in contact with the chemical.

(Continued on page 7)

Early Season Insects – 2008 **(Continued from page 6)**

Higher water volumes can be beneficial for better coverage and soil penetration. Keep in mind that it can take up to ten days for optimum control, since not all larvae come to the surface on any given night.

Other factors that can affect control include the level of infestation, size of the larvae and crop stage. Higher populations and larger cutworms will be more difficult to control, and will require higher rates. A lush crop canopy will prevent the chemical from reaching the soil surface, resulting in untreated spots and reduced efficacy. Once the cutworms start to pupate, feeding will stop, making control efforts unnecessary. Female moths are attracted to green plant material. Since most cutworm moths lay eggs in August and early September, reducing green plant material in fields later in the summer is advantageous.

The Pea Leaf Weevil in Southwest Saskatchewan

The pea leaf weevil was first found infesting pea crops in Saskatchewan in 2007. Although the highest infestations are in the Maple Creek area where the weevil first entered the province, the distinctive damage has now been observed in pea crops further east, to south of Gull Lake and in the Shaunavon area.

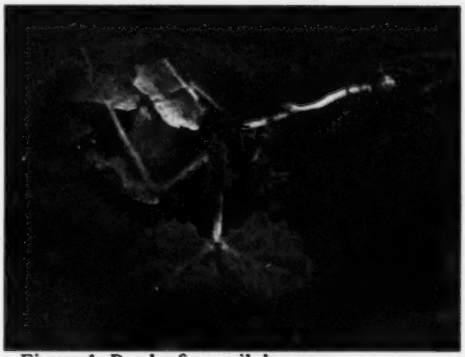


Figure 1: Pea leaf weevil damage
Source: Crop Protection Laboratory

Typical feeding results in scalloping of the leaf margins (Figure 1).

The pea leaf weevil is a nocturnal feeder, remaining in cracks in the soil during the day. The adult weevil has a short snout and is a greyish brown colour. It is about five millimetres in length with three light stripes on the thorax and the hardened wing covers (elytra) on the abdomen. Due to its feeding habits and colour, it is difficult to find the weevil in the soil during the day.

The pea leaf weevil has an annual life cycle, over-wintering as an adult in roadsides, alfalfa fields, grasslands and vegetative debris. They emerge as temperatures warm in the spring, seeking food, primarily pea, but also feed on alfalfa, vetch, beans and clover. The adult weevils fly at temperatures above 15°C. Eggs are usually laid in late April and May in the soil or on plant tissue. Upon hatching, the pale larvae feed on the nitrogen-fixing *Rhizobium* nodules on the roots. Adult feeding on the leaves can be most serious to young seedlings. The significance of larval damage to the nitrogen fixing capability of the plant, and ultimately yield, is being investigated by Agriculture and Agrifood Canada in Lethbridge.

(Continued on page 8)

Economic thresholds and control:
Damage to leaves is the best way to determine economic levels of pea leaf weevil. At least 10 plants, at a minimum of five locations at the edge of the pea field, and at about 100 metres into the field should be sampled. The current level at which control is recommended is when at least one out of three plants shows damage on the terminal leaves.

Control measures appear to be most effective, if an insecticide is applied prior to the fifth to sixth node stage of the crop. The only foliar insecticide currently registered is Matador. Since the mode of action of Matador is primarily through contact, application should be made in the evening, although good results can be achieved during the day, if temperatures are between 10 and 25°C. The lower temperature is to ensure the weevils are active, and the higher limit is due to reduced efficacy of Matador, a synthetic pyrethroid, at high temperatures.

Flea beetles
Flea beetles have not been a serious pest in canola or mustard in Saskatchewan for a few years. These insects prefer a warm, dry environment. After ideal conditions in the early years of this decade, flea beetle populations were greatly reduced in the cool, moist seasons experienced in 2004-05. Since then, flea beetle populations have been re-building, and have not had the consistent conditions required for a rapid increase in numbers. Southern areas of the province have generally had less precipitation and more heat units, particularly in July of 2007, and represent the more likely regions for flea beetle pressure in 2008.

Although the spring has been cool, flea beetles can be an economic problem for producers in *Brassica* crops that were planted without a seed treatment. Feeding and damage can be different under cool, moist conditions. The beetles may not be as active, and feeding may be on the underside of cotyledons (Figure 2) and early leaves. Girdling of the stem of young seedlings has also been noted in the past. Scouting of canola and mustard should include inspecting for damage on these parts of the plants to ensure crop establishment is not seriously affected.

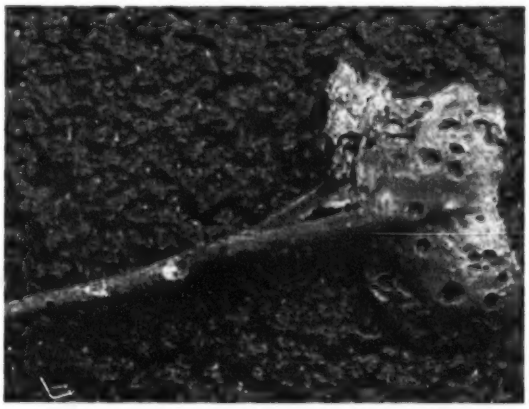


Figure 2. Flea beetle damage. Source: Canola Council of Canada

(Continued on page 9)

Early Season Insects – 2008 (Continued from page 8)

Bertha Armyworm Monitoring Program 2008

The Saskatchewan Ministry of Agriculture is conducting a bertha armyworm monitoring program in 2008. This is similar to previous years, and is in conjunction with the Prairie-Wide Pest Monitoring Project that will include data submitted from Alberta, Manitoba and British Columbia (Peace River region). Agriculture and Agri-Food Canada (AAFC) is coordinating the joint effort.

Supplies for the pheromone traps (Figure 3), and monitoring of adult bertha armyworm moths are being sent out to co-operators for set up in early June. The cool conditions of 2008 will have a delaying effect on the emergence of the moths from over-wintering pupae. Data from the co-operators will be compiled and mapped on a weekly basis through June and July, and posted on the Saskatchewan Ministry's website to estimate areas of concern in the province.

Co-operators who have not been contacted and are willing to participate in 2008 should contact Sean Miller (phone: 306-787-4670 or email: sean.miller@gov.sk.ca). ✿

Figure 3. Bertha armyworm trap. Source: Saskatchewan Agriculture

Cereal Staging of Early In-Crop Herbicides

By Clark Brenzil, Provincial Weed Control Specialist

Several weeks of cool temperatures and high winds have resulted in many producers taking the "seed now, spray later" gamble. The gamble will be lost by many as their crops begin to emerge from the soil. This is prompting calls about early herbicide applications to manage these situations in competitive and non-competitive crops.

(Continued on page 10)

Cereal Staging for Early In-Crop Herbicides **(Continued from page 9)**

Research has shown that early weed control, whether pre-seed or in-crop, provides the best return on investment to the producer. But, as crops begin to emerge and burnoff applications have to be aborted, plants are left to fend for themselves amongst potentially advanced weed seedlings.

The most critical time for weed control is at the one to two leaf stage of the crop, when it is most vulnerable to competition. This message is well known to producers. Unfortunately, all herbicides do not fit equally well into this early use pattern, and some can result in injury to the young crop.

Phenoxy (Group 4) herbicides are often referred to when talking about herbicide staging restrictions. With both MCPA and 2,4-D, the physiological point when cereals become most tolerant is after tillers have been initiated. This doesn't mean that tillers are visible, but have been set by the apical meristem. If tillers are visible, it clearly indicates that initiation has occurred and plants should tolerate phenoxy herbicides. Tiller initiation usually occurs at the three to four leaf stage. MCPA is typically easier on the cereal crop than 2,4-D, and can be applied earlier. Bromoxynil plus MCPA products can be applied from the two leaf stage because the MCPA rate is only 280 g ae/ha (ae = acid equivalent), or four ounces active per acre whereas when used alone, MCPA rates can be as high as 420 to 560 g ae/ha (six to eight ounces active per acre).

Group 4 injury in cereals can resemble drought symptoms early in the season, where the leaf curls along its length in a symptom referred to as "onion leaf." Phenoxies kill broadleaf plants by causing uncontrolled cell growth that constrict water transport vessels in the stem. Grass plants also undergo some uncontrolled cell growth, but water vessels are not severely affected due to their physical structure. Injury symptoms also show up as the head emerges from the boot in the form of kinked heads and aborted florets. The kinked heads occur, because the collar of the flag leaf is constricted and the extension of the head out of the boot is slowed. Florets abort due to their exposure to phenoxy herbicide during head initiation.

Each year, the Crop Protection Laboratory receives cereal samples exhibiting phenoxy symptoms. In August 2004, following another cool spring with poor burnoff activity/opportunity, there were a greater number of samples than normal, arriving with late season phenoxy symptoms.

It was concluded that the increase was in part due to the cool, wet conditions that favoured rapid herbicide uptake and activity in general, but also due to early application. A clue to early application in those cases, where application timing was not indicated clearly, was that about half were in Everest tank mixes. Arysta has been promoting early post-emergent application of Everest, which is frequently mixed with 2,4-D. Symptoms in these cases were typical of 2,4-D and not Everest.

(Continued on page 11)

Cereal Staging for Early In-Crop Herbicides **(Continued from page 10)**

There are other herbicide alternatives in cereals that will allow early application. Most grass-control products allow applications from the one leaf to tillering stages of growth. These include Achieve, Avenge, Axial, Everest (without 2,4-D), Horizon, and Puma 120 Super. Most non-Group 4 products for broadleaf weed control recommend a minimum of two leaves on the crop. The new Infinity (bromoxynil + pyrasulfotole) broadleaf herbicide recommends a minimum of one fully extended leaf as the minimum crop stage for application.

Care is required at this time of year to determine cereal staging and herbicide selection to prevent yield loss. An excellent guide to cereal staging for herbicide application can be found on page 16 of the *2008 Guide to Crop Protection*. Choose herbicides wisely to avoid yield loss! ✿

Authority herbicide given a limited registration on chickpea in 2008

By Clark Brenzil, Provincial Weed Control Specialist

Authority 480 herbicide (sulfentrazone) has recently received a very limited registration for use on chickpeas grown on **fine and medium textured soils in southern Saskatchewan only**. The Pest Management Regulatory Agency (PMRA) issued this limited registration in acknowledgement of the need for weed control options to control kochia in chickpeas. With a field half-life of 121 to 302 days and moderate mobility in soil, PMRA has questions about Authority's persistence in the soil, potential to leach into groundwater, and recropping restrictions. Additional data has been supplied by FMC, the manufacturer, to address these deficiencies.

Even though Authority is persistent, there are several viable recropping options. **However, lentils are particularly sensitive to damage from Authority residues, and should not be seeded on land treated with Authority for at least three years after application.** Authority requires moisture for breakdown, and as a result, drought years cannot be included when calculating recropping or retreatment intervals. Authority can only be applied once in 36 months due to its persistence in the soil.

Nufarm Agriculture will be distributing Authority in Canada on behalf of FMC. There will be limited product available this season, and Nufarm is now completing their distribution plan. Nufarm is interested in hearing from producers that are still able to integrate application of the product into their cropping plans, and have yet to seed their chickpeas. **Note**: Authority must be applied to the soil no later than three days after seeding. PMRA is being very cautious about this registration, and will be monitoring for any off-label use. It is important to emphasize that use of the product on any crop other than chickpea could jeopardize future registration prospects.

(Continued on page 12)

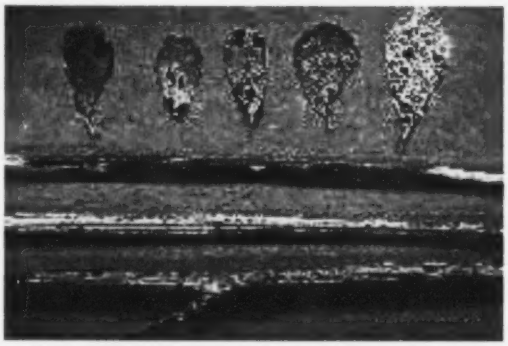
Authority Herbicide given a limited registration on chickpea in 2008 **(Continued from page 11)**

An information page has been produced for Authority based on the Canadian label and will be included in the Spring Update to the *2008 Guide to Crop Protection*, on the Ministry of Agriculture web site at www.agriculture.gov.sk.ca/Guide_to_Crop_Protection once availability of Authority is announced. Check for updates. The full label for Authority can be found on the PMRA web site at www.pmra-arla.gc.ca/english/index-e.html ✿

Spring black stem can reduce alfalfa vigour and yield

By Michel Tremblay, Provincial Forage Specialist

Some alfalfa fields can seem slower off the mark, and have an unattractive colour. The reason may be due to spring black stem and leaf spot, caused by the fungal pathogen *Phoma medicaginis*.



Spring black stem; lesions on leaflets and stems
Source: American Pathological Society

Spring black stem can cause a field to have a "dingy" appearance from a distance as a result of leaf and stem discoloration; leading to reduced growth rates, yield and quality. Plants can be stunted and unthrifty, with more serious infestations reaching further up the stem and affecting leaf tissue. Symptoms begin with the formation of small purple lesions that look like "tar spots" on stems, leaves and crown tissue. As the disease progresses, lesions coalesce and turn black, potentially girdling the stem. Lower leaves may drop off and young stems and crowns may be killed, explaining the open, unbranched look of some fields. If cool moist weather persists, infection may spread to upper portions of the developing alfalfa plant, causing flowers and pods to drop. Seed can be infected, lowering seed weight and creating discoloration. Spring black stem can also cause seedling blight. Inoculum persists on crop residue and crowns, and can be spread by using infected seed. Fruiting bodies, or pycnidia, produce spores in fall and spring, which spread by rain splash. Successive years of cool wet weather may result in a disease outbreak.

Prevention of spring black stem can be done by using certified seed and/or fungicide seed treatments. Cut older infected fields earlier than normal to reduce inoculum spread and quality loss due to dropped leaves. If using normal harvest timing, cut cleaner crops first to avoid spreading inoculum to other fields. Burning fields in the spring can reduce inoculum load. However, burning can slow spring growth and thin the stand. The mancozeb-based foliar fungicides Dithane DG, Manzate DF, and Manzate Pro-Stick are registered for use on **seed alfalfa only**. Make first application prior to 50 per cent bloom and repeat if necessary to a maximum of three times per season.✿

Phosphate fertilizer is needed to hasten maturity for late-seeded crops

By Ken Panchuk, Provincial Soils Specialist

June seeded crops require phosphate fertilizer to hasten maturity, as well as for yield. Even after the soils have warmed up, early access to phosphate remains important for maturity. Gaining one or more days in maturity means minimizing the risk of damage to immature crops due to an early fall frost and/or unfavourable harvest weather. Getting the crop in the bin a few days earlier may also lead to a reduction in the cost of aeration drying.

Phosphate fertilizer placement with, or near the seed, remains the key to efficient phosphate uptake and optimizing early season growth. The faster the early season growth, the more likely maturity will be hastened as well. Just a reminder – do not exceed the safe rate of phosphate applied with the seed especially for small-seeded oilseeds, like flax, that are sensitive to seed-placed fertilizer.

For more information on applying phosphate fertilizer or other agronomic strategies to hasten maturity for late-seeded crops, contact the Agriculture Knowledge Centre at 1-866-457-2377.

Also see a copy of the *Phosphorus Fertilization in Crop Production* fact sheet at: - www.agriculture.gov.sk.ca/Production - under Crops – Fertilizer / Nutrients. ✿

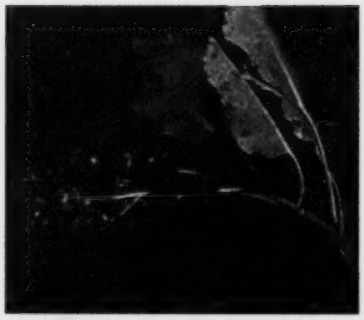
Do you have more questions about crops, livestock, nutrient management or farm business management?

... Contact our friendly and knowledgeable staff at the
Agriculture Knowledge Centre
Toll-free helpline **1-866-457-2377**

Or, check on-line at: http://www.agriculture.gov.sk.ca

Control of *Entomosporium* Leaf and Berry Spot on Saskatoons

By Forrest Scharf, Provincial Fruit Crops Specialist



Entomosporium leaf and berry spot
Source: Richard St-Pierre

Saskatoon berry growers often note that leaves on their bushes get covered in brown spots that eventually lead to yellowing of the leaves. Similar spots develop on the berries, making the fruit unmarketable. The symptoms are usually the result of *Entomosporium* leaf and berry spot. Like most diseases, infections can be worse in some years than in others, and if left untreated, the prevalence of the disease increases while the bushes weaken.

Factors that influence the growth of the disease include temperature, precipitation, the presence of disease spores, and orchard management practices. Mild winter temperatures allow more spores to survive. Overwintering spores spread onto the new year's growth, due to motion created by precipitation. So the more rain, the more likely disease will spread. If bushes are not properly pruned and are planted too close together, the disease can easily spread from plant to plant. Disease survival improves in "high humidity" environments, so if the canopy does not allow air flow, the disease will spread. New leaves seem to be more susceptible than older mature leaves, and temperatures between 10 and 20 degrees Celsius help spores germinate. Resistance to the disease varies, and some saskatoon cultivars show much better resistance than others.

In 2005, most of the Canadian prairies had a mild winter. The climatic conditions favored *Entomosporium* development, and as a result, the yield of harvested saskatoon berries plummeted to roughly 50 per cent of normal. At that time, Dr. Quinn Holtslag began conducting *Entomosporium* research. Following on the knowledge developed by R. St-Pierre, P. Ronald, and A. Zatylny (among others), Quinn developed a disease model to predict how *Entomosporium* responds to climatic conditions. Members of prairie fruit grower organizations have access to Quinn's web-based computer program. Growers enter temperature and precipitation data for their orchard location, and then based on calculations, the program recommends when the grower should spray fungicides and when they should expect to harvest their crop. His model has proven to be very accurate, and some of the concepts it includes may be helpful to backyard saskatoon growers as well.

In general, *Entomosporium* spreads during precipitation events while the saskatoons are in bloom. So spraying after a rain event during the blooming period is the best timing for disease control. Topaz fungicide is registered for the control of this disease. It is systemic and can remain active for up to 21 days after application.

For more information about the disease model or saskatoon production, contact Forrest Scharf (forrest.scharf@gov.sk.ca). ✿

Optimum and Minimum Plant Populations for Crops

By Elaine Moats, Crop Development Specialist and Dale Risula, Provincial Special Crops Specialist

Crop producers agree that one of the most anxious times of the year comes after seeding as the crop begins to emerge. If the emergence is uneven, the question is, "how do I determine if reseeding is necessary?" The following tables provide guidelines for evaluating a field. To determine your plant stand, count the plants that are most likely to survive the growing season. More advanced plants have a better probability of survival: i.e. cereals – two to three leaf; pulses – one to three node; oilseeds – one to two true leaves.

Table 1 includes optimum and minimum plant densities for common crops grown in Saskatchewan. The third column in Table 1 refers to "Minimum Plant Density for a Satisfactory Yield". The phrase "satisfactory yield" means different things to different people, and in most cases, it will be lower than the provincial average yield. Factors that will influence the outcome of a field with low plant densities include: the level of weed control, uniformity of plant density across the field, and growing season rainfall. Insect and disease pressure will also affect the outcome.

Table 1. Optimum and Minimum Plant Densities

Crop	Optimum Plant Density	Minimum Plant Density for possible satisfactory yield *
Cereals	240-260 plants/m² **22-24 plants/ft²**	110 plants/m² **10 plants/ft²**
Winter Wheat	215-250 plants/m² **20-25 plants/ft²**	45-63 plants/m² **4-6 plants/ft²**
Mustard	80-180 plants/m² **7-17 plants/ft²**	40 plants/m² **4 plants/ft²**
Canola (argentine)	70-120 plants/m² **7-12 plants/ft²**	40 plants/m² **4 plants/ft²**
Canola (polish)	70-170 plants/m² **7-17 plants/ft²**	40 plants/m² **4 plants/ft²**
Pea	75-88 plants/m² **7-8 plants/ft²**	22 plants/m² **2 plants/ft²**
Lentil	130 plants/m² **12 plants/ft²**	33 plants/m² **3 plants/ft²**
Chickpea / Dry Bean	33-44 plants/m² **3-4 plants/ft²**	22 plants/m² 2 plants/ft²
Flax	300-500 plants/m² **28-46 plants/ft²**	110 plants/m² **10 plants/ft²**
Canaryseed	300 plants/m² **27 plants/ft²**	110 plants/m² **10 plants/ft²**
Buckwheat	143-187 plants/m² **13-17 plants/ft²**	65 plants/m² **6 plants/ft²**

* assumes good weed control for this minimum plant density **(Continued on page 16)**

Optimum and Minimum Plant Populations for Crops **(Continued from page 15)**

Growers with crop insurance should remember to check with their local Saskatchewan Crop Insurance Corporation office before taking action that may impact their establishment benefit.

Table 2. Establishment Benefit Plant Density Guidelines.
Source: Canada-Saskatchewan Crop Insurance Corporation **

Crop	Establishment benefit Plants/Square yard	Customer choice Plants/Square yard	No establishment benefit Plants/Square yard
HRS Wheat	Less than 70	70-110	110 +
Durum Wheat	Less than 70	70-110	110 +
Barley	Less than 70	70-110	110 +
Oats	Less than 70	70-110	110 +
Flax	Less than 100	100-150	150 +
Canola (Argentine)	Less than 25	25-40	40 +
Canola (Polish)	Less than 25	25-40	40 +
Fall Rye	Less than 45	45-63	63 +
Sunflower	Less than 3	3-4	4 +
ESRS Wheat	Less than 70	70-110	110 +
Mustard (Oriental)	Less than 25	25-40	40 +
Mustard (White/Yellow)	Less than 25	25-40	40 +
Field Peas (Small)	Less than 25	25-35	35 +
Field Peas (Large)	Less than 25	25-35	35 +
Lentils (Small)	Less than 30	30-50	50 +
Lentils (Large)	Less than 30	30-50	50 +
Canaryseed	Less than 70	70-100	100 +
SWS Wheat	Less than 70	70-110	110 +
Spring Rye	Less than 70	70-110	110 +
Triticale	Less than 70	70-110	110 +
Winter Wheat	Less than 45	45-63	63 +
Fababeans	Less than 10	10-15	15 +
Dry Beans	Less than 10	10-20	20+
CPS Wheat	Less than 70	70-110	110 +
Coriander	Less than 55	55-85	85 +
Chickpea (Desi)	Less than 25	25-35	35 +
Chickpea (Kabuli)	Less than 15	15-25	25 +

**based on Saskatchewan Agricultures recommended plant densities and seeding rates. ✿

The ***Crop Production News*** is a regular publication of the
Crop Development Branch, Saskatchewan Ministry of Agriculture.
Editor: Ray McVicar, Manager – Production Technology Section; Phone: (306) 787-8733;
e-mail ray.mcvicar@gov.sk.ca